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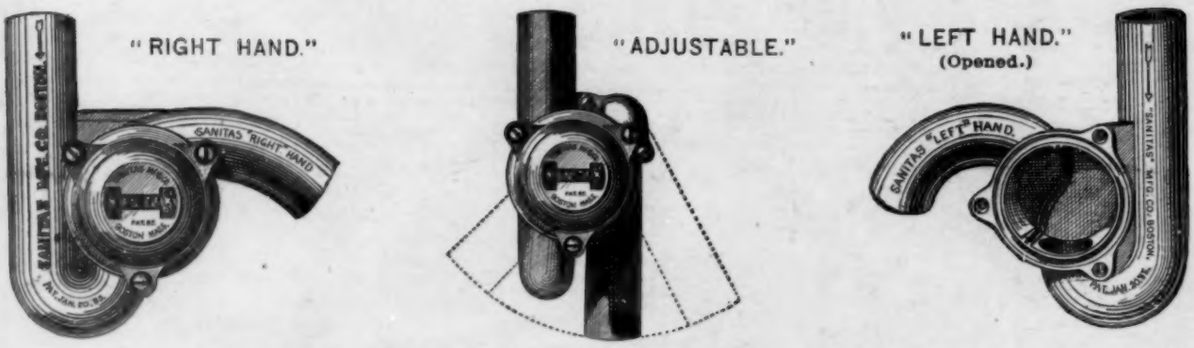

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THE *British Architect* has received from Mr. Fox, of Boston, a copy of the new Building-Law of that city. Mr. Fox, in the note accompanying the book, is too modest to mention that he was himself the most energetic promoter of the passage of the statute, and the author of many of the best provisions in it, but this should make the warm, and evidently sincere commendation with which it is received all the more gratifying to him. Although far from what its promoters wished it to be, it is one of the best codes for the regulation of building yet established, and the *British Architect* well says that "such disasters as that in the Edgware Road" (the fall of a building) "where defective construction played such a prominent part in the destruction of human life, would be practically impossible in Boston," and, further, that "in comparison with the by-laws of many of our English towns, Boston ought to be an exceptionally well-built city." It should be borne in mind, in estimating the value of this praise, that the ordinary methods of construction in this country are far more hazardous than they are in England. Few English houses have any sort of wood furring on the inside of their brick walls, and many of them have not even wooden window or door frames, while the stud partitions, especially in the older houses, are very frequently "brick-nogged," or, as we should say, filled in with brick between the studs. Compared with such a structure, the ordinary New England brick building, with its walls furred with spruce strips from cellar to roof, its chimneys encased in a cage of studding, wood-lined exterior cornices, its "air-spaces" in the attic, and hot-air pipes everywhere, and its roaring furnace in the basement, is a mere tinder-box, yet we may confidently say that Mr. Fox and his associates, by the ingenuity with which the perils of so light a construction are met, have, while retaining all its undoubted advantages of dryness, reduced the risk from fire in it below that in the average London house, while in other respects the construction which the new law enforces is much better than that often seen in England, where, as our readers know, it is not unusual to hear of the arrest of a builder for laying bricks in "road-scrapings," instead of mortar, or for some similar enormity.

IT is not that the speculating builders of Boston have no disposition to use a cheaper material than mortar, if they think they can do so with impunity — their exploits in the way of South End plumbing a few years ago would make that clear — but under the present administration of the statute they have little chance of committing any flagrant violation of it without being caught and punished, and they do not try. Unlike the English laws, under which the inspectors devote their principal attention to the plans, our American statutes provide for a more or less efficient supervision of the actual operations, and the officers appointed for this work exercise almost despotic authority. With the small official force employed, such authority is recognized as necessary to efficiency, and, although an appeal lies from the deputy-inspectors to their chief, and from him to a commission of experts, an order from a deputy to remove a tier of floor-beams too light, in his judgment, for their work, to take down and rebuild a doubtful piece of wall, or to cart away a lot of damaged cement, or dirty sand, is rarely resisted. This sort of administration is really the essence of an efficient law, and, as the *British Architect* remarks, another important merit of the Boston law, which it shares with that of other American cities, is the strictness with which it requires that minor alterations shall be subject to its provisions, as well as more important building operations. In the familiar phrase, "any change or addition in, to or upon any building, affecting an external, party or partition wall, chimney, floor or stairway," in a Boston or New York house, must be approved by the Chief Inspector of Buildings, and carried out under the supervision of his deputies, and the disasters which, under different auspices, have so often followed the attempts of amateurs or ignorant builders to "knock out a window" in a wall, or "do a little cutting" in a floor, or a little digging about the foundations of their own dwellings, or those of other people, are here almost unheard of.

MR. H. W. Fabian, of New York, publishes in the regular Proceedings of the Technischer Verein of that city a discussion upon the action of forces in arches which presents some novel points. He applies the principles which he deduces from his reasoning to the vaulted ceiling of the Assembly-Chamber at Albany, and concludes that, while its construction was incorrect, and sure to fail under the loading which was put upon it, certain modifications might have been made in it which would render it perfectly secure, and he is rather disappointed, we judge, that this should not have been done. We are not sure that we agree with him. Although a bold and startling piece of construction has a certain interest, it is not an artistic interest, and the admiration we feel for it should be carefully distinguished from that with which we regard a beautiful object. At present we need, more than anything else, to pursue the path of beauty in architecture rather than that of startling novelty. The Americans have amazed the world by their temerity long enough to be satisfied with the reputation they have gained; and they may now safely try to make their buildings attractive in some other way.

THE great interest taken by Americans in the sales of the Demidoff, Hamilton and other famous European collections, leads us to suppose that a similar interest will be felt in the approaching sale of a similar collection which is to take place early in the coming autumn. For one reason or another, Portugal is a little off the regular line of American travel in Europe, and few probably know that high up on the mountain side in Cintra, a few miles from Lisbon, lies the Castle of Pena, which should be familar to English readers from the reference to it in Byron's "*Childe Harold*." The town below is somewhat affected by the inhabitants of the neighboring capital as a summer resort, and was probably made more popular still by the selection of the castle by the late King Dom Fernando as his favorite place of residence. Much money has been spent in converting the place from its original conventual character into a modern royal residence, and more money still in collecting together the specimens of paintings, sculpture and bric-à-brac which now form one of the choicest and most carefully selected collections in Europe. These collections are somewhat unique in that they were largely gathered by the king in person, who was himself an artist of no slight pretensions, painting, modelling and etching with no little assiduity. The castle and collections were the personal property of the late king, and as his successor has no desire to acquire them personally, and as the royal exchequer is too empty to allow

the government to buy them for public use, they are to be thrown on the market and disposed of to the highest bidder. A castle in Portugal may not be as attractive as one in Spain, but the collections are transportable, and American gold would find ready acceptance at Cintra if any of our collectors should send agents to attend the sale.

CONTRACTORS, and others, who use horses for heavy draught, may find it useful to know of certain experiments which have been made in lightening the work of the animals by the use of elastic traces. Some time ago, as *Le Génie Civil* informs us, M. Celler, Chief Engineer of Roads and Bridges in France, expressed a doubt whether the traces of leather or rope, or the iron chains, by which horses pull their load, could not advantageously be replaced by more elastic appliances, which would diminish the effort needed at starting, to overcome the inertia of a heavy cart or omnibus. Every one has noticed that a dray-horse is often obliged to use all his weight and strength to start a vehicle which moves along easily enough when once set in motion, and it is quite conceivable that springs in the harness might make the work easier by distributing the movement of starting over a longer period of time. Acting on M. Celler's suggestion, the directors of the Eastern Railway of France began six years ago to harness all the horses employed in shifting freight cars at their Paris station with traces made of chains, having a strong spiral spring inserted in them. A large number of horses is employed in this service at the station, and the effect of the change has been very satisfactory. A considerable gain has been made in the durability of the harness, and the regularity of the work, through the diminution of the number of chains broken in service; while the horses have done their work better, and with less fatigue. The blow of the collar on the shoulders at starting is far less violent, and less injurious to the animal, than under the old system, and the horses, finding that a strong, continued pressure will effect as much as the jerk which was formerly necessary, seem to gain courage, and pull steadily and directly, instead of wasting their strength in ineffectual plunges. During the six years of trial, the directors of the Company have become so convinced of the superiority of the new mode of harnessing that it has been adopted in all portions of the vast net-work of lines under their control.

ARRIVAL of Mr. Buddensiek seems to have met his reward in Germany, to judge from an account in the *Bautechnische Zeitschrift*. In October, 1886, a building in Hamburg, which had been nearly completed by the contractor, Brümmer, fell, while the workmen were in it, killing three of them, and seriously injuring four more. Two experts, an architect and the official inspector of buildings, examined the ruins, and decided that the immediate cause of the fall was the giving way of a bay-window, which was partly built, and, by its collapse, had shaken the neighboring walls so much as to overthrow them. It was ascertained that the bay was to have been supported on projecting iron beams, or cantilevers, and that these were in; but the walls had not been built up on the inner ends, so as to keep them from being overbalanced by the weight of the bay, and a temporary support, which seems to have been inadequate, had been set up under the bay. In any case, it appears to have been rather doubtful if the iron construction, even when completed, would have held the bay securely, and the evidence showed that the materials used in the building were generally poor, and the workmanship hurried and bad. The mortar, particularly, had little cohesion, and the bricks seemed to have been laid without wetting them. The contractor denied that either the workmanship or the materials were faulty. He said that he was a regularly trained mason, had acted three years as foreman, and had been a contractor on his own account for eight years. It was very unlikely that he would be ignorant or neglectful of the rules of his art, and his materials were of good quality. He attributed the fall of the bay to the removal of the temporary support by some unauthorized person, and thought it possible also that the carpenters might have pushed the wall out of its place in setting the floor-beams. In regard to the responsibility for the accident, he claimed that if the ironwork, or any other part of the construction, was defective, the architect who had furnished him with the plans was the one to blame; if the carpenters had pushed the wall over, they were accountable. The architect testified that he had made the drawings for the ironwork by the direction of the contractor, and according to his instructions; and, to make sure they were understood, he had furnished a model, showing how the cantilevers were to be set. He thought that the weight of the bay had been allowed to come on the projecting ends of the cantilevers before the inner ends were loaded by the walls. Brümmer denied this, and said that he gave directions to have the masonry built on the inner ends, but no one was produced who had heard the directions. Several experts were examined, one of whom testified that the carpenter-work was not very good, and not very bad; while another said that it was a disgrace to the man who did it. A third thought that the catastrophe was due to the insufficient anchoring of the floor-beams, while a fourth laid it on the ironwork again, and exhibited a model to show that it was inevitable with such construction. A fifth thought that many defects, both in the plan of construction and the execution, had combined to cause the accident. In answer to questions, however, he said that he thought the mason was the person responsible, and that, although bricks were often laid dry, he regarded this as a violation of the well-known rules of the art of building. How the court could have formed any opinion from such conflicting testimony it is difficult to see, but it decided that the mason, Brümmer, was the person at fault, and ordered him to pay the costs of the trial, and to be imprisoned for three years, and on appeal this judgment was confirmed.

THE *Engineering and Building Record* describes an "hydraulic shovel," which has been used in the work on the Forth Bridge with good effect. In sinking the caissons for this huge structure a stratum of boulder clay was found, so hard that the pick would remove only pieces about as large as a man's fist, and the labor of excavation was very costly and fatiguing in consequence, the more so as it was necessarily carried on in an atmosphere under considerable pressure. Under these circumstances, it occurred to Mr. Arrol, who has already invented on the spot many useful appliances for the work, that the iron roof of the caisson might be made to serve as a resisting point, the reaction of which would help to drive a shovel into the clay. To make this available, large shovels were made, with handles consisting of hollow cylinders, in which moved pistons carrying the blade of the shovel. The handles were long enough to reach nearly to the ceiling of the caisson, and were furnished with supply-pipes and valves. The working face in the clay was about fifteen inches deep, and the spades, exhausted of water, were set with the blades a little back from the face. By turning a valve, water under pressure was admitted to the cylinders above the piston, pushing the cylinders upward until they struck the caisson roof. Continued pressure then forced the shovel blades into the clay, to a depth regulated by the length of the cylinder. The next step was to release the water, which flowed out of the cylinders, allowing them to descend. The workmen then seized the handles, and using them as levers, threw out the shovelfuls of clay, to be broken up and removed by other men, while the blades were reset for another operation. The cost of excavation in this way was about one-half that of removal by hand-picks, and the work was done much more rapidly, and with less fatigue to the men. The exhaust water which accumulated in the caisson was disposed of in a way hardly less ingenious. To avoid distressing the men, the pressure of the air in the caisson, after it was made tight against the entrance of the water around it by sinking the edges into the clay, was allowed to fall to a point much below the hydrostatic pressure due to the head of water above it. As the clay was hard enough to resist the effort of the water to burst through it, there was no danger in reducing the pressure, but it became doubtful whether the pumps used for removing the exhaust water, working in an atmosphere relatively so attenuated, would lift it through the sixty or eighty feet hoist necessary to reach the surface. This question was solved by the bold and simple expedient of setting the suction-pipe so as to draw in air with the water. In passing through the valves together the air and water were churned into a sort of emulsion, much lighter than pure water, a column of which was easily kept pouring out of the upper end of a discharge-pipe eighty feet high, without resorting to force-pumps or air-chambers. Of course, there was a certain expenditure of power in pumping the air, but this was of no importance.

EQUESTRIAN MONUMENTS. — I.

"Bring forth the horse"! — the horse was brought:
In truth, he was a noble steed. — "*Mazeppa*" — *Lord Byron.*

Bronze Head in the Museum, Naples.

IF the reader is one to whom a horse is a mere adjunct of locomotion, a creature whose ailments are of interest only in so far as they affect the pocket, to be sold without compunction, to die without causing a quiver of sentiment, a pang of regret, he cannot appreciate the underlying love for a noble animal which more than anything else has led to the researches which are to result in these papers—a love which must be considered the key-note to every success that art has achieved in the department of equestrian monuments. Extract sympathy from the works of any artist and a soulless husk is left, which, while it may satisfy the eye for a short time, has nothing to say to the intellect, and soon looses its grasp on the attention of the passer-by and is known not as a work of art but simply as an obstruction to traffic.

Of equestrian monuments that do not excite the sympathies of the observer there are many, just as there are dull works of sculpture of other kinds. They are mere matters of fact, and being made of enduring material last much longer than they should; for the tooth of time bites with difficulty into bronze, and even marble yields but slowly. In passed ages invasion and conquest must have done invaluable service to art, for it may be taken for granted that in time of siege, for instance, it was the poor bronze statues that were first melted for use as projectiles or armor of one kind or another, just as the marble caricatures of contemporary or former worthies must have been the ones first broken into fragments of convenient size for the catapult or of proper weight to drop handily on the heads of the besiegers. For the concealment of works of real art there were generally to be found enough *amanti artium* to interest themselves to some advantage to their own immediate posterity, and our more remote selves. Many a curious adventure must have had the works of art of antiquity which have survived to our day, and as one passes through the museums of modern Europe he ought not to forget his obligation to some group of panic-stricken wretches who in spite of fear and haste succeeded in hiding the masterpiece which now delights him. When one recalls how many of the most highly appreciated works of sculpture in our museums were preserved to us in this way, he cannot wonder at the enthusiasm of explorers or that governments are willing to spend large sums on excavations in the hope that now and then a Venus of Milo or its equivalent may be brought to light.

The equestrian statues that descend to us from antiquity are not many, and how most of them came to be preserved is matter for conjecture, but in the preservation of two of these statues the forces of Nature aided in a very unusual way. In 1719 the site and history of Herculaneum[1] were brought to mind through the

[1] HERCULANEUM. — "Like the neighboring Roman pleasure resort Pompeii, Herculaneum was destroyed by a terrible eruption of Vesuvius A. D. 79; but whilst Pompeii was overwhelmed by showers of burning ashes and pumice-stone, which have easily been cleared away, Herculaneum was imbedded in torrents of lava mud, which has since hardened to the consistency of stone, and has safely preserved all its art treasures for the benefit of posterity. The guides at Herculaneum, who are as ignorant as Italian guides generally are, tell the visitors that molten lava destroyed the town. It is a pity that many writers have supported such an erroneous theory, for had molten lava poured into the town, it must have flowed at such a temperature as would have undoubtedly calcined marble and silver, and certainly have consumed such inflammable matter as papyrus. In fact, up to the date of 1036, no fluid lava, according to the records, flowed from Vesuvius; but since that date, like a stream of molten iron, red-hot lava has poured eleven times on the buried city. Owing to the excessive hardness of the material the excavations are carried on with the greatest difficulty; and as the Italian Government made but slight efforts to obtain the numerous treasures hidden in the solid rock, the excavations are now almost, if not entirely, abandoned. This is very greatly to be deplored, as the objects already brought to light are, from an art point of view, of far greater merit than those found at Pompeii. The excavations were first commenced in 1720 by Prince Elbœuf, who discovered some pieces of marble whilst sinking a well for his country house. Several fine objects were discovered, which were presented to Louis XV of France. Afterwards Charles III of Naples, cleared the theatre, part of the forum, a basilica, resembling that at Pompeii, and a few private houses. The yield of works of art was an uncommonly rich one, consisting of bronzes, marble busts and statues, paintings, inscriptions, utensils, and from the Villa Escolanese the marvellous collection of papyri, over 3,000 rolls. Then for some years the excavations were suspended, to be resumed again in 1868, and then once more allowed to decline, and, as before stated, at present they are almost abandoned. The difficulties are indeed enormous, and the work is very costly, for it is no easy task to remove the huge masses of lava, rock, and tufa stone. Still, the treasures which would without doubt be discovered should amply compensate the Italian Government for the trouble and expense. The principal building cleared is the Villa Escolanese — at least, it has yielded the finest artistic treasures and it belonged to a wealthy Roman, rich in works of art and literature. Most important to the proper survey and original disposition of the villa is the admirable plan drawn up by the engineer, Carlo Weber; but this, like so many of the maps and embossed plans of the first excavations made in the Kingdom of Naples, was lost. Fortunately Direttore Ruggiero recovered it, together with a most important packet of papers referring to other clearings. The map is drawn with such care and fidelity that it fully deserved the high praise of Winckelmann. It is enriched with explanatory notes, and with the aid of numbers and letters it gives the exact disposition of all the objects. The text, unfortunately, does not follow the whole plan — it stops at the discoveries of July 20, 1754, whilst the plan extends to the work of 1760." — *Birmingham Weekly Post.*

Balbus the Younger, in the Museum, Naples.

Marcus Nonius Balbus, in the Museum, Naples.

digging of a well, the excavation for which, penetrating the crust of lava and ashes which five or six eruptions subsequent to the original one had accumulated over the unfortunate city to the depth of nearly one hundred feet, brought to light traces of the buried city of promise and interest enough to encourage explorations at different times; the first serious work being begun in 1738. It must be remembered that the excavations at Herculaneum and Pompeii[1] are wholly different in character; in the latter case the city was buried in volcanic ashes over which no lava flowed, so that exploration there is carried on in open trenches and excavations, while at Herculaneum the work is true mining-work with shafts, drifts and galleries entirely below the crust of lava mud. One of the most important structures examined at Herculaneum is the theatre — one capable of seating eight thousand persons — and here were discovered and removed to the Museum at Naples (with the exception of one daughter, now in the Museum at Dresden) nine statues of the family of Balbus, two of which are equestrian statues, — the proconsul Marcus Nonius Balbus and his son. These statues are interesting not only because of the place of their discovery, but because of the unusual attitude of the horses' legs, the two legs on the same side of the body being advanced, so that the horses amble or pace. This attitude was once said to have no earlier prototypes save in the case of the Assyrian bas-reliefs where the same peculiarity exists, but a closer examination of the frieze of the Parthenon shows that the assumption was a mistaken one. Of course, like all imperishable things recovered from these buried cities, these statues were in excellent state of preservation, but, unfortunately, during an attack on Portici in 1799, the head of the younger Balbus, which was at that time stored in the town, was smashed by a bullet, so that the head the statue now bears is a restoration, after a cast made from the fragments. These statues are of marble, and are now in the Museum at Naples.

Marcus Aurelius, in the Piazza del Campidoglio, Rome.

We Americans to whom it is still a matter of much pride to have within the boundaries of the neighboring city even a single public statue, afoot or on horseback, that we can go and gaze upon, cannot imagine the surroundings of a Greek or Roman citizen of even the lower class who was as free as the highest patrician to derive pleasure from the hundreds of statues[2] in the

[1] Pompeii. — Destroyed in 79. In ancient times excavations were made, owing to which many valuable relics are probably lost to us, but during the Middle-Ages Pompeii was entirely consigned to oblivion. In 1592 the architect Fontana constructed a subterranean water-conduit in order to supply Torre dell' Annunziata from the Sarno, actually intersecting the ruins, and to this day in use; yet no further investigations were then attempted. In 1748 the discovery of statues and bronze utensils by a peasant attracted the attention of Charles III, King of Naples, who caused excavations to be made. The amphitheatre, and other parts were then disinterred. The Forum, the Street of Tombs, etc., were uncovered in the reign of Murat. Excavations, after being for many years occasional, are now carried on systematically with highly satisfactory results.

[2] Number of Ancient Statues. — "How feeble is the effort of the imagination to conceive the number and magnificence of the public edifices which shot up from Roman soil after the conquest of the Greeks! Here statues singly and in groups adorned the niches, intercolumniations and roofs, filled the pediments and lined temple-steps, theatres, basilicas, baths, gateways, bridges, balustrades and arches of all kinds. Like Rome itself, all the provincial cities had their forums, crowded with temples and colonnades, their capitols crowned by the

Alexander, in the Museum, Naples.

Amazon, in the Museum, Naples.

public places of his native town, and much less can we picture the contents of those villa gardens of Imperial Rome where the descendants of the army contractors of earlier days had collected the artistic wreckage brought by the camp-followers from the many enlightened and art-loving countries that had felt the Roman arms. If we may believe the records many a

Assyrian Bas-relief.

private collection in those days would outshine the average public collections of to-day.

Goth and Hun and Vandal and Saracen and other barbarians[1] visited on the arrogant Roman the violence and robbery that had been served out to those of their kind in other countries, but it is a question whether art suffered more at their hands than it did at the hands of the early Christians when they first began to feel their growing power, and began to war openly against the false gods and their images. Being wielded by enthusiasts, extremists, bigots, the besom of destruction was likely to do more thorough work than would be accomplished by the

Falling Amazon, in the Museum, Naples. From Duruy's "*Histoire.*"

wanton and purposeless mischief of a victorious barbarian who might, indeed, tip a statue off a pedestal or break off a leg or an arm in passing, but was little likely to sit down beside it with a maul and pound it into such small fragments as to be quite beyond the skill of the most painstaking of *réparateurs*.

What might have come to us if it had not been for these enthusiasts, who may be pictured as stern and ascetic as the most consistent of the early Roundheads, is betokened by the existence of the statue of Marcus Aurelius, which is said to be but one out of the twenty-two equestrian statues which even in the fifth century of our era still adorned the public places of Rome. The others have vanished, some, perhaps, to which were assigned the Voodoo-like functions of *telesmata*[2] may hereafter be recovered by following up the indications of some ill-understood record, but this one which had been moved in 1187 by Sergius III from its place in front of the Arch of Septimius Severus to a place in front of the Lateran, was consequently somewhat forgotten, so that when the storm of iconoclasm broke it was taken to be a statue of the Christian Emperor Constantine,[3] and was not only preserved but treated with special reverence.

Michael Angelo, who fashioned the pedestal from a portion of a cornice found in the forum of Nerva in 1538, is said to have entertained the greatest respect for this piece of bronze horseflesh, and when he designed the buildings on the Capitoline Piazza, wished to remove thither the statue from its resting-place in front of the Lateran, but only obtained the consent of the fathers by agreeing that their proprietorship in the statue should be acknowledged each year, an acknowledgment which is still made in the shape of a bunch of flowers sent by the Senate to the churchmen.

The strange and moving tales these almost imperishable memorials of the past could tell can be imagined when it is known that the Marcus Aurelius was once used as a gallows from which to hang a refractory prefect whom John XIII chose to suspend in that way by his hair. In the sixth century, too, it came very near being lost to sight or at least establishing itself after the manner of other peripatetic statues in some other place where it might have been held in less honor; for

Nero, in the Museum, Naples.

temples of Jupiter, Juno and Minerva, as well as their theatres, amphitheatres, baths, circuses — all adorned with sculpture. In 58 B. C. Scaurus, it is said, used for his temporary wooden theatre in Rome three hundred and sixty columns of foreign marbles from Eubœa and Melos, besides three thousand bronze statues. Agrippa, while ædile, 33 B. C., decorated his extensive water-works with four hundred marble columns and three hundred marble and bronze statues, his work to be continued by others. Domitian built so many passages and triumphal arches crowded with groups of statuary, *quadrigæ*, and insignia of war that he became the object of ridicule." — *Mitchell's History of Ancient Sculpture.*

[1] INVASIONS OF ROME.— In 382 A. D. Rome was taken by the Gauls under Brennus and in 408–10 by the Visigoths under Alaric. The Vandals under Genseric plundered Rome in 455 and the Goths under Totila in 546. Its environs were devasted at different times by the Huns under Attila (447) and by the Lombards (755) and the Saracens (846 and 876) and the Magyars, 10th century. In 1084 Guiscard burned the city, and it was sacked by the Constable de Bourbon in 1527. It was also besieged at various times by the Germans and was torn by incessant civic feuds.

[2] TELESMATA. — "From the darkest period of the Middle-Ages, or even from the days of antiquity many cities in Italy had kept the remembrance of the connection of their fate with certain buildings, statues, or other material objects. The ancients had left records of consecrating priests or Telestæ, who were present at the solemn foundation of cities, and magically guaranteed their prosperity by erecting certain monuments or by burying certain objects (Telesmata)." "The Florentines were convinced that the temple of Mars, afterward transformed into the Baptistery, would stand to the end of time, according to the constellation under which it had been built; they had, as Christians, removed from it the marble equestrian statue [of Mars?]; but since the destruction of the latter would have brought some great calamity on the city — also according to a constellation — they set it upon a tower by the Arno. When Totila conquered Florence [in the sixth century], the statue fell into the river, and was not fished out again till Charles the Great refounded the city. It was then placed on a pillar at the entrance to the Ponte Vecchio, and on this spot Buondelmonte was slain in 1215. The origin of the great feud between Guelph and Ghibelline was thus associated with the dreaded idol. During the inundation of 1333 the statue vanished for ever. But the same Telesma reappears elsewhere. Guido Bonatto, was not satisfied — at the refounding of the walls of Forli — with requiring certain symbolic acts of reconciliation from the two parties (Guelphs and Ghibellines). By burying a bronze or stone equestrian statue, which he had produced by astrological or magical arts, he believed that he had defended the city from ruin, and even from capture and plunder. When Cardinal Albornoz was governor of Romagna some sixty years later, the statue was accidently dug up and then shown to the people, probably by the order of the Cardinal, that it might be known by what means the cruel Montefeltro had defended himself against the Roman Church. And again, half a century later, when an attempt to surprise Forli had failed, men began to talk afresh of the virtue of the statue, which had perhaps been saved and reburied. It was the last time that they could do so; for a year later Forli was really taken." — *From Burckhardt's "Renaissance in Italy."*

[3] MARCUS AURELIUS.— The statue was then commonly assigned to Constantine; but those who pretended to know better affirmed that it was erected in memory of a warrior who, when the city was besieged during the republican times by a powerful king who had come from the East, went forth at midnight, and, guided by the singing of a bird to a place which the king frequented, seized him and brought him prisoner to Rome." — *From Dyer's "History of the City of Rome."*

Totila, King of Goths, possibly believing the statue was of pure gold, made off with it, and it was almost ready for shipment when Belisarius overtook him, gave battle, and as one of the consequences of his victory redeemed the statue.

More peaceful and joyous scenes have passed under the sightless eyes of the Roman emperor, as when all plebeian Rome rejoiced when Rienzi achieved the most important step in his career and in 1347 was allowed to make himself tribune: then the great bronze horse was made to take a part in the festivities, and from one nostril discharged wine and from the other water, so that all who could reach it might drink and be merry. Traces of the gilding which once covered, it is thought, both horse and rider, still remain, and local tradition has it that this gilding is not disappearing, but rather on the increase, and when the coating is complete the world will have reached its end. A companion tradition also declares that when the Colosseum falls the world will be annihilated.

In the bronze statue of the emperor Nero, now in the Museum at Naples, we have another statue preserved by the volcanic ashes that covered the forum at Pompeii. There is something laughable about this truculent personage — who was not much given to causing laughter in his day and time — in the way he sits his horse. He seems to be trying to ride as the initiated coster rides his donkey, who sits as far aft as possible

Commodus, in the Vatican Museum, Rome.

seemingly only to prevent by his weight those spiteful flings of the little beast's hind legs, though it really makes the load more supportable than if it bore on the centre of the spinal column.

In the Vatican galleries is a statue of that Beau Brummel of emperors, Commodus, dandy, pseudo-gladiator and supreme brute, who also commanded deification at the hands of an obsequious priesthood and populace and in his pride caused the erection in his own honor of countless statues, mounted and unmounted, until every one was weary of meeting his self-complacent image at every turn and rejoiced when at his death the senate ordered their destruction by wholesale. The statue that survives shows the emperor, perhaps, as about to strike down some hapless victim in the arena. It has the merit, at least, that the man is sitting his horse properly. It is said that Bernini made use of this group in modelling his equestrian statue of Constantine now in the portico of St. Peter's at Rome.

In the Museum at Naples are also the bronze statuettes of Alexander on Bucephalus and two archaic figures of mounted Amazons, both recovered from Herculaneum.

In the same place is the colossal bronze head of a horse, one of the most animated pieces of animal sculpture[1] in existence and in spite of its unnatural position — the severed neck supporting the head upright on a columnar pedestal — attracts admiration from all, an admiration which gains by the legend that it is the emblem of the city. In reality it is all that remains of a statue that stood in the vestibule of the temple of Neptune — in what other place could the statue of a horse be so fitly placed? — where it attracted so much attention, even worship, that the priests finally themselves destroyed it, as the story goes, but fortunately did their ungracious task but ill and the head remains to us. Another story ascribes its destruction to a later date, and the vandal who gave the order for destruction is there said to be an archbishop who needed the greater part of the bronze for a new bell he wished to have cast for his church.

[1] "This horse is a personage; ours are machines." "*Italy, Rome and Naples*," Taine.

Marcus Aurelius Antoninus, the noblest of Pagans, the crown and flower of Stoicism. Born at Rome A. D. 121, of noble blood. His father died when he was an infant and he was adopted by his grandfather, who educated him in the most perfect manner. The noble qualities of the child attracted the attention of the Emperor Hadrian, who adopted as his successor Titus Antoninus Pius, the uncle of Marcus Aurelius, on condition that he in turn adopted his nephew and Lucius Celonius Commodus. After the death of Hadrian and the accession of Antoninus Pius, Marcus Aurelius had the title of Cæsar conferred upon him, and in 140 was made Consul and entered fully upon public life. In 161 Antoninus Pius died and Marcus Aurelius, then forty years old, became his successor ruling jointly with Commodus, commonly called Lucius Verus, who died in 169. Marcus Aurelius had married Faustina, the daughter of Antoninus Pius. Many misfortunes occurred in the reign of Marcus Aurelius — an inundation of the Tiber which did great damage and caused a famine, earthquakes, fires, plagues of insects and a fearful pestilence. Besides, during his reign, the Empire was involved in almost continuous wars with the barbarians. Marcus Aurelius died in 180, after a short illness and was deified. His son Commodus (afterwards emperor) erected to his memory the Antonine Column now in the Piazza Colonna at Rome. He early embraced and throughout his life adhered to the Stoical philosophy. This great philosopher had but one blemish, his hostility to the Christians. His life was in keeping with his precepts. His philosophy is contained in his "*Meditations*" or "*Reflections*," a famous work.

A cast of the equestrian statue of Marcus Aurelius, which Catherine de Medici ordered, was set up in the court-yard of the palace at Fontainebleau (thenceforward called Le Cour du Cheval Blanc), under a roof raised upon four pillars to protect it from the rain, where it remained until the year 1626. It was made for Francis I, about 1540, who sent Primaticcio to Rome to purchase antique marbles and have moulds taken of several famous masterpieces of sculpture that they might be cast in bronze. There was a cast of this statue in the court-yard of the Contranda degli Omenoni known as the Casa Aureleana, at Milan. This house was given by Charles V to Leone Leoni, the sculptor.

Nero. — Lucius Domitius Ænobarbus, called Nero after his mother's marriage to the Emperor Claudius, by whom he was adopted; born Dec. 15, A. D., 37; proclaimed emperor, 54; his first years of rule were marked by kindness and justice, and his last by a series of atrocities, which led to a conspiracy, on the discovery of which and the defection of the Prætorian guards, Nero killed himself, A. D., 68.

Commodus: — Lucius Aurelius Commodus (161–192). Emperor of Rome, 180 to 192. Born at Lanuvium. Son of Marcus Aurelius and Faustina. Carefully educated but chose the society of profligate favorites and common gladiators. Blind to his faults, however, his father gave him the title of emperor when not more than fifteen, and at sixteen he shared the imperial power in every department, except the chief pontificate. On the death of Aurelius, whom he had accompanied in war against the Germans, Commodus hastily concluded peace and hurried back to Rome (180). He there gave himself up to unbounded license, at first, however, in private. Led by a vulgar vanity and carefully protected from serious danger, he displayed his skill in the arena by shooting hundreds of wild animals and meeting in fight numbers of gladiators. He called himself the Roman Hercules and commanded that he should be worshipped as such. Many plots were made against his life, which were several times attempted, and he was finally poisoned and then strangled in December, 192.

[To be continued.]

The Illustrations

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

NEW WING OF THE WESTERN DEPARTMENT-BUILDING, OTTAWA, CANADA. MR. THOMAS S. SCOTT, ARCHITECT.

[Gelatine Print issued only with Gelatine and Imperial editions.]

STORE, CORNER OF TREMONT AND WINTER STS., BOSTON, MASS. MR. J. A. FOX, ARCHITECT, BOSTON, MASS.

THE NEW WING OF THE MUSEUM OF FINE ARTS, BOSTON, MASS. MESSRS. STURGIS & CABOT, ARCHITECTS, BOSTON, MASS.

THE new wing on Dartmouth Street will cover a slightly larger area than the portion already built but will cost less, the difference being as $220,000 to $360,000. This difference is owing partly to the difference in market prices and partly to a change in the material; the terra-cotta of the older portion being replaced in the new with buff brick and Ohio stone.

MONUMENT TO ST. ALPHONSUS DE LIGOURI, CALVARY CEMETERY, BOSTON, MASS. MR. T. O'GRADY, ARCHITECT, BOSTON, MASS.

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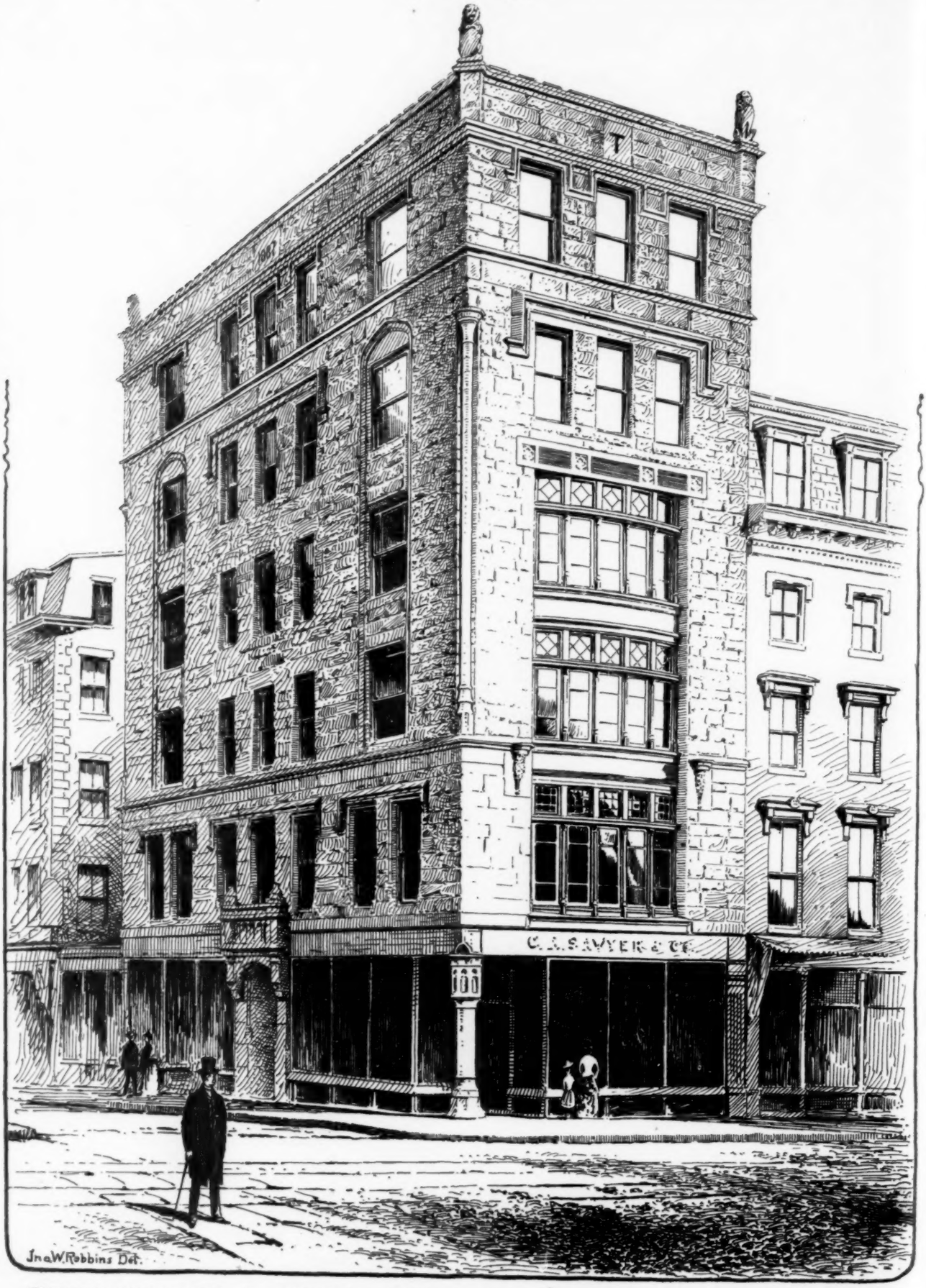

BUILDING ON CORNER OF TREMONT AND WINTER ST'S BOSTON. JOHN A. FOX ARCH'T.

Heliotype Printing Co. Boston

No. 657. American Architect and Building News, July 28 1888

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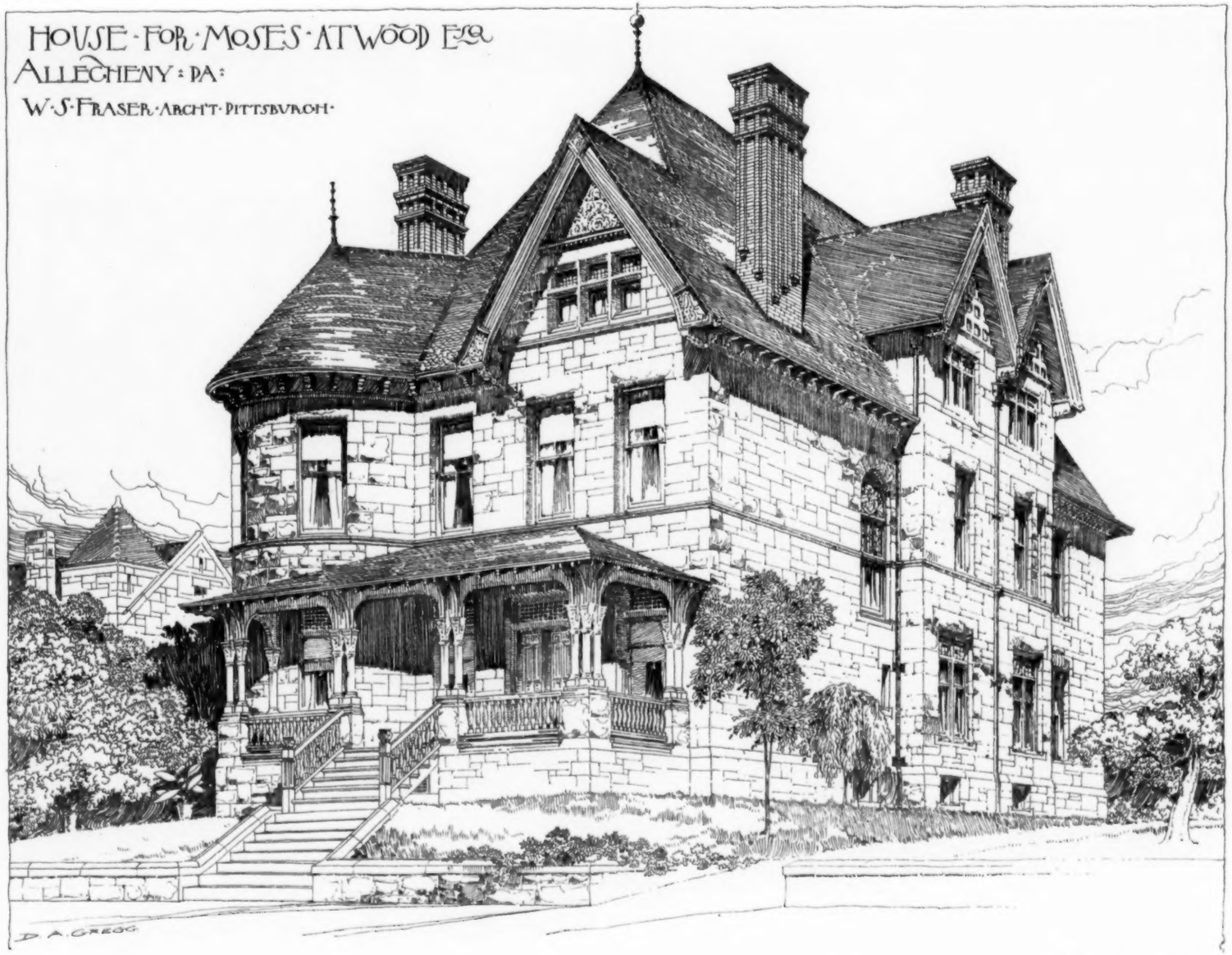

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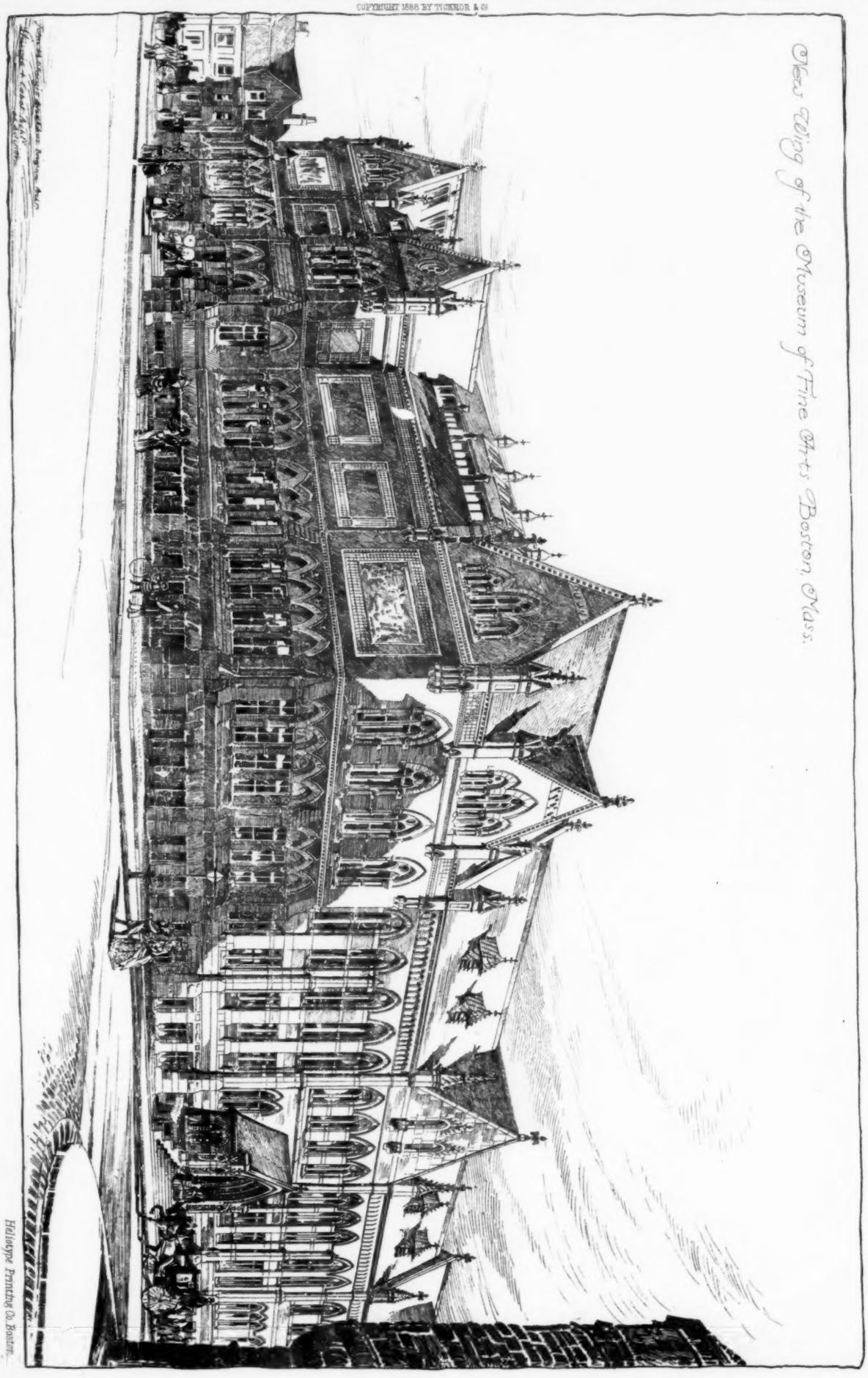

New Wing of the Museum of Fine Arts Boston Mass.

Heliotype Printing Co. Boston.

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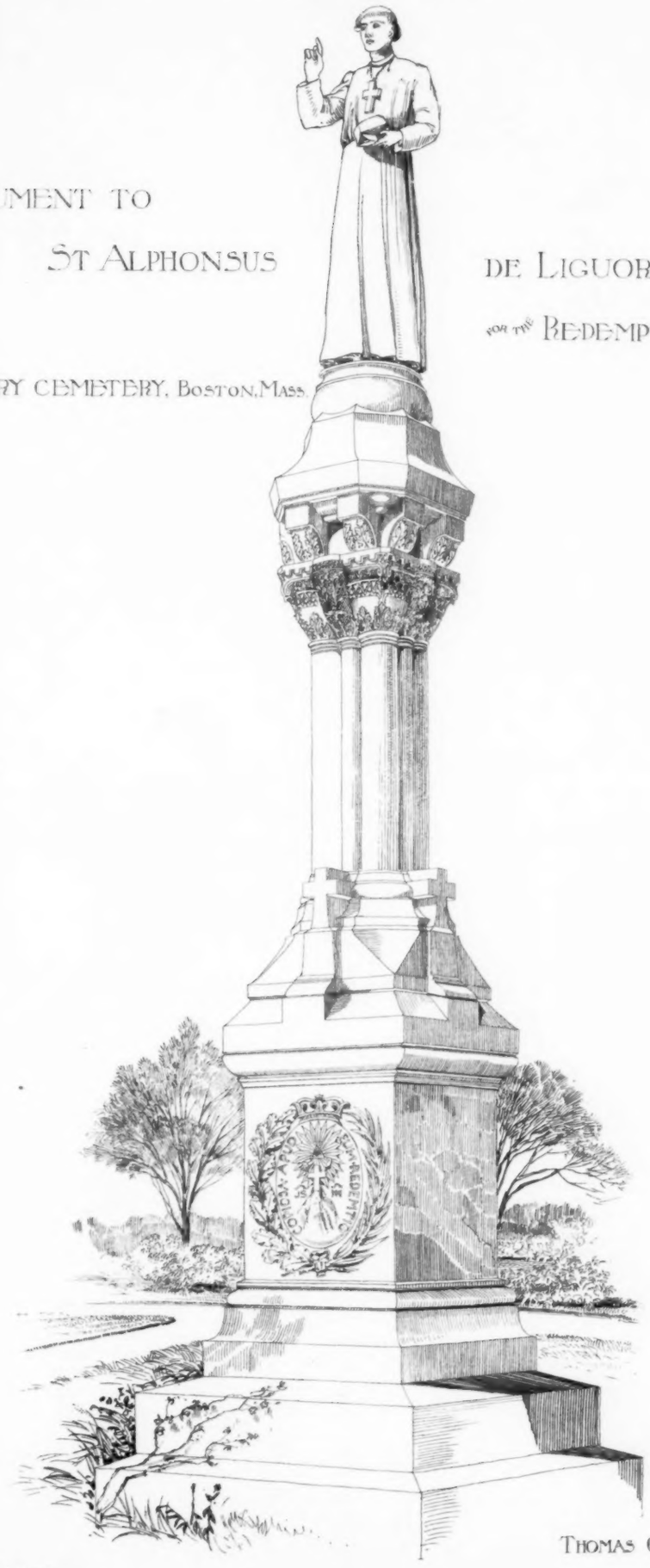
MONUMENT TO ST ALPHONSUS DE LIGUORI

FOR THE REDEMPTORISTS' ORDER.

CALVARY CEMETERY, BOSTON, MASS.



THOMAS O'GRADY, JR. ARCH'T.

Heliotype Printing Co. Boston.

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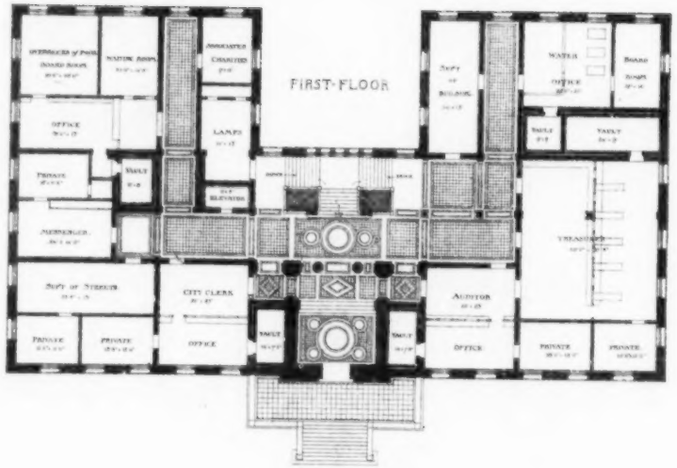
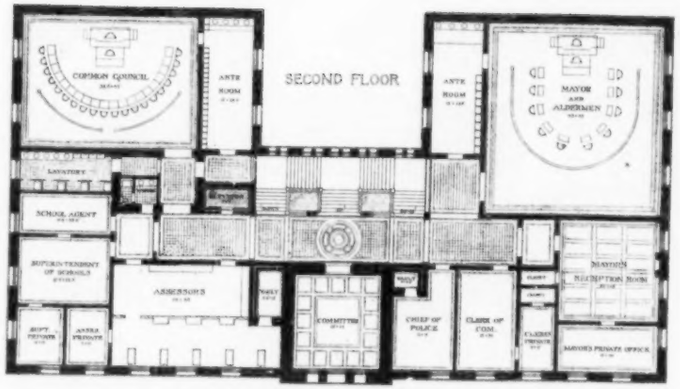
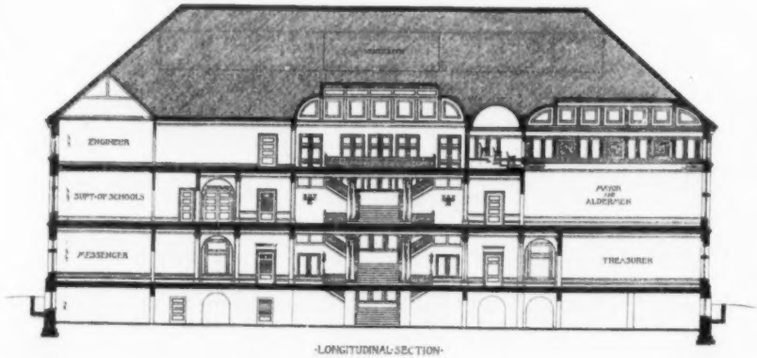
ACCEPTED DESIGN FOR
CAMBRIDGE CITY HALL

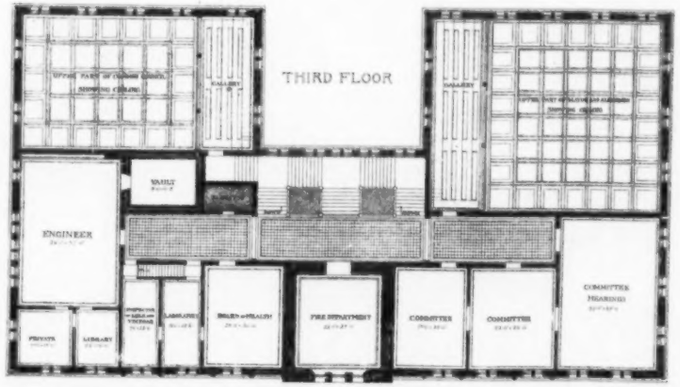
Longfellow Alden & Harlow.
Architects







-LONGITUDINAL SECTION-

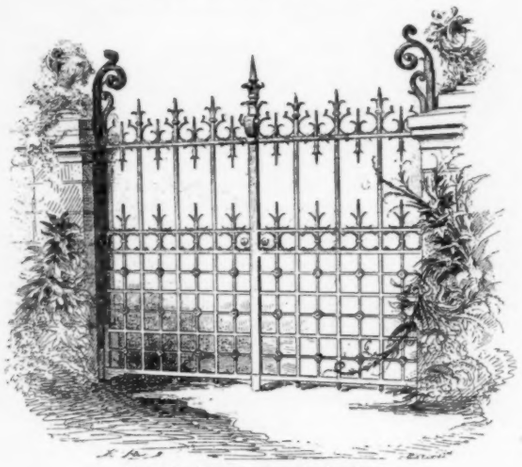


Heliotype Printing Co Boston

THE cost of this structure above foundations is $4,150.

ACCEPTED DESIGN FOR THE CITY-HALL, CAMBRIDGE, MASS. MESSRS. LONGFELLOW, ALDEN & HARLOW, ARCHITECTS, BOSTON, MASS.

BUILDERS' HARDWARE. — I.



From *La Semaine des Constructeurs.*

THE series of articles which it is our intention to publish under this title, embraces a subject which has a direct bearing upon the work of the architect, and is, at the same time, of vital interest to the builder. The articles are, however, written primarily for the architect. Most builders, we fancy, are already pretty well posted on the subject of the hardware which they are called upon to use in the construction and finish of a house; but our experience has led us to believe that architects, as a rule, seldom go any deeper into the subject than is necessary to decide whether knobs shall be of one material or another, or whether some particular pattern of sash-lock will be satisfactory to the owner. It is needless to say that a more extended acquaintance with the subject would do no one any harm, and might even be conducive to much good, if only in the way of providing more fittingly for the needs of the client. These articles are not intended, however, to be over-critical in their nature, nor necessarily so exhaustive as to embrace all the inventions and arrangements comprised in the general term of builders' hardware, though an attempt will be made to discriminate between what is merely novel and what is really suitable, and so far as possible the best of everything will be noticed under various heads, and an effort will be made to represent as nearly as possible the conditions and limitations of the builders' hardware market, as well as to show what is valuable for the uses of the architect.

It must be remembered that the statements are made from an architect's standpoint rather than from that of the builder or the manufacturer. The object in view is to show what can be obtained for special cases, and how it is necessary to be specified in order that there shall be no doubt in the minds of both builder and client as to what is called for. It is not intended to present abstracts of trade-catalogues, and if the series fails to represent all the wares in their proper light, or at times seems to ignore some valuable inventions or place undue stress upon articles that do not receive the heartiest commendation from those who use them, we can only plead in extenuation the difficulty of finding out everything that is in the market. Many of our best appliances have only a local and limited fame; and as they are advertised sparingly, it is often quite difficult to say exactly that such and such an appliance is absolutely the best.

For example, some Boston dealers consider that the best locks in the country are the hand-made goods turned out by such firms as Enoch Robinson's Sons. Without discussing the peculiar merits of the Robinson locks at this point, the assertion may safely be ventured that any one studying the subject in San Francisco would have as much difficulty in an investigation of Boston hand-made goods as we have had in our endeavors to deal with hundreds of valuable inventions which are hardly known at all in this part of the country. The hope is, therefore, expressed that this publication may call out facts concerning many articles of builders' hardware which at present are unknown to the ordinary trade. Any notes or suggestions relating thereto will be gladly considered by us, for future publication.

It can only be hoped that the series may suggest to architects the possibility of more definite specification, and of some better way of selecting and defining the necessary hardware than to merely insert a clause in the specification to the effect that a certain sum per door and a certain price per dozen is to be allowed in the contract for fixtures. This we know is a very common method of disposing of the question, and is, no doubt, the easiest way out of the difficulty, relieving the architect entirely from any necessity for exhaustive explanations in regard to subjects upon which he generally is not over-well posted. With an honest builder, or with one who has the fear of the inspector before his eyes and knows that all will be scrutinized, this may be a method sufficiently exact to suit most cases; but where the market is so full and there are so many really excellent appliances to choose from, it would seem certainly as if more exact specifications ought to be prepared. How many architects, for instance, ever insist upon a particular style of lock; and how many architects, even after many years experience with the best work, are able to tell a client what is the best sash-lock or what is the best style of hinge, without referring to a trade-catalogue? We cannot hope to meet all emergencies, but it is believed that, at least, a desire for a better selection of hardware than is generally possible can be stimulated.

In these articles the term "builders' hardware" is assumed to include, generally speaking, metal-work of every description entering into the construction and finish of a modern building, from the nails and bolts used in the rough work to the door furniture, and brass lock and plate work of the finish.

The illustrations, which include nearly every article referred to, have been prepared as simply as possible. A great deal of care has also been taken in collecting the prices. The ordinary trade-catalogues are very unsatisfactory in this latter respect: many of them give no prices at all, and when the cost is stated it is always subject to discounts so uncertain and varying as to give absolutely no real information of value to the architect or the purchaser. The prices hereafter given will represent the retail cost of the articles in the Boston market, as nearly as we are able to ascertain it. These prices are, of course, somewhat fluctuating in their nature, but will, at least, serve as a means of comparison even if not exact for all localities and seasons.

In the collection of the subject matter which is to follow, the writer has had the heartiest coöperation from the leading dealers and manufacturers, and desires to especially acknowledge the courtesies of Messrs. Burditt & Williams, and Nichols & Bellamy, of Boston, the Hopkins & Dickinson Manufacturing Co., and the Yale & Towne Manufacturing Co.; without whose technical assistance any such papers would lack the value which it is hoped these will possess.

C. H. BLACKALL.

[To be continued.]

THREE NEW HOUSES AT THE SOUTH END — CHANGE OF GRADE CAUSED BY APPROACHES TO A NEW BRIDGE. — THE LIBRARIANS AND THE CONGRESSIONAL LIBRARY.

DURING the present season the number of really fine residences being erected on Michigan Avenue is greater than in any year for some time past. The extremely rapid growth of the city has already shifted the fashionable quarter so far south that Thirtieth and Fortieth Streets, which but a few years ago were on the very outskirts, are now no longer out of the world, but are quite the central portion of the elegant universe, and some of our finest city houses are being built in this vicinity. On the west side of the Avenue, near Thirty-fifth Street, one of the largest of these residences is now nearing completion, the exterior being practically finished. It spreads over considerable ground, and is fortunate in having a fair-sized yard; the material is a grayish marble — mostly rock-faced — and the architect has shown his wisdom by not having any sides or bays that show from the street built, as so often is the case, of common

brick, the stone is used on three sides, the brick having been relegated to the rear. At first sight the general outline of the house seems to be extremely agreeable, but the wonderment is, why after looking at it for a time, it does not grow upon one and become more and more satisfactory. This effect must be attributed principally to the mode of treatment, and to the stone itself, which as mentioned above, is a grayish marble. As long as the material is rock-faced the appearance does not call forth any particular protest, but when it is more or less tooled, as on the sill-courses and water-table, then the veins of the marble become so apparent as to be disagreeable, and, in part, at least, account for the disagreeable features of the effect. Moreover, there has evidently been a lack of study of the arrangement of the stone itself: the courses are practically of the same thickness and the blocks of the same size; while the first water-table and all sill-courses are insignificant, giving no particular character to the work. Such carving as there is, has been so distributed in small bits here and there, instead of being concentrated, as to produce no satisfactory impression, while the carving itself is not all that could have been wished. But if all these bad points had been transferred to a house standing at the north about fifteen feet, by comparison with what now exists, they would have been almost worthy of praise for being so nearly perfect. The building in question has, undoubtedly, cost a large sum of money, and is built (on the front) of an expensive red sandstone, but in possessing all the styles of architecture from the Swiss Romanesque of the twelfth century to the fifteenth century Flamboyant of Flanders, it naturally possesses no style at all — except possibly the nineteenth century Wild West of Chicago.

A little farther north on the opposite side of the street is, however, a rather small but extremely charming front which shows an amount of refinement delightful to see. It possesses the quiet ordinary features of a stone bay and a stone porch, but worked together very simply and with remarkably good effect. The stone used is one of our commoner kinds, but unlike the marble it improves by the working, and, moreover, the details of carving have evidently been carefully studied both by the designer and the carver, so that the result is delightful. Aside from the topping-out of the bay-window with boulders and a somewhat awkward stone-railing to the front steps, this front is, by far, the most satisfactory of any in the neighborhood.

For sometime past a new bridge has been building at Jackson Street, across the south branch of the river. This structure is now approaching completion, and the property-owners in that vicinity will be put to great expense and annoyance by the changes in grade necessitated by the approaches. Some of the heaviest storage-buildings in the city are at this point, and nearly all of them will have to be raised more or less. To some of the owners of these buildings have already been awarded damages. One storehouse gets twenty-six thousand dollars, and many others are hoping to get a proportional share. The extremely large and heavy building owned by the McCormick estate is very shortly to be bodily raised seven feet to accommodate itself to this new grade. This is an almost new structure of the strongest class, and is said by the raisers to be nearly twice as heavy as any building in the United States ever before lifted up bodily.

However the architectural profession may feel on the subject of Mr. Smithmeyer and the Congressional Library, the librarians throughout the country do not seem greatly grieved nor show an alarming amount of sorrow for Mr. Smithmeyer, if their sentiments are voiced by some of their number in this city. In view of the present turn of affairs at Washington, it is curious and not uninteresting to quote at some length certain lively selections from a pamphlet published *four years ago* by Mr. Poole, the eminent librarian of this city. The paper appears to have had a rather limited circulation, and was at the time only incidentally referred to in the *American Architect*. The apparently exact fulfilment of some prophecies as to cost is of interest. In explanation it must be said that the pamphlet in question was published in reply to certain criticisms by Mr. Smithmeyer upon a system of library-construction advocated by Mr. Poole in a previously issued paper.[1] On page 29, he says: "It is a singular fact that amidst the superfluity of self-laudation over his own plans and the announcement emblazoned on every page, that in the judgment of a committee of Congress his plans were superior to those of forty-one other competitors, there does not appear the commendation of a single librarian of this or any other country. . . . Mr. Smithmeyer has not quoted the commendation of any librarian, for the reason he could not secure one. The librarians have publicly expressed their views in a series of resolutions unanimously adopted at a meeting of the American Library Association at Cincinnatti, May 26, 1882."

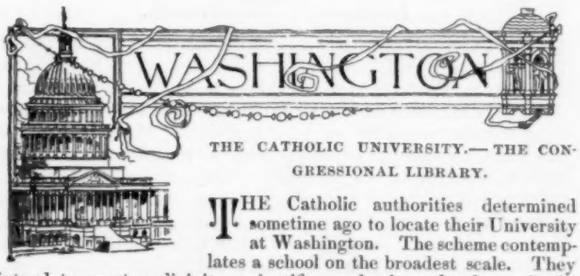
Again, he says: "It is a singular fact that neither in the pamphlet under consideration nor in the paper he read before the American Library Association is there an estimate of the cost of his building, or of its capacity for storing books, and yet Congress is asked to adopt plans and begin the erection of a building without any information on these essential points. . . . The House of Representatives, at the last session of Congress, voted by a decisive majority that the cost of the building should not exceed two millions of dollars. Does Mr. Smithmeyer propose to erect a building on his plans for the sum named? He says nothing about the cost, and for the obvious reason that the sum, if named, would alarm Congress and the country, and defeat his scheme. . . . The estimates of architects who have examined the crude and ill-digested drawings which have been printed vary from ten to twelve millions, and some place the cost as high as fifteen millions of dollars. The objections which the librarians of the country have to the plans are not based upon the needless expense involved . . . but they are based on the fact that the building, when completed, will be wholly unadapted for the uses of a library, and hence be a discredit to the nation. It will be a monstrosity which intelligent Americans will be ashamed of and foreigners will sneer at."

Again, on page 33, he says: "At the last meeting of the American Library Association held at Buffalo, a resolution was adopted urging Congress to take speedy action in the erection of a new building for the National Library, and 'offering in behalf of the Association to furnish any information or assistance in its power which may be called for by the Congressional Committee charged with the consideration of the subject.' The Committee has asked for no such information and assistance, and hence none has been given."

From these quotations it is easy to see that the librarians very justly feel that they have been snubbed and ill-treated by the persons in charge of the plans, and consequently they easily believe the affair a huge swindle, otherwise advantage would have been taken of the offers of assistance coming from men whose lives are spent in managing great libraries, and who would naturally be expected to have some very clear ideas gained by actual experience.

As a result of this treatment they have no great sympathy with Mr. Smithmeyer, and cannot understand the ethics of the architectural profession which would cause architects to stand up for a man whom they consider should have been repudiated, first, last, and all the time.

[1] See *American Architect*, Vol. X, page 131.



THE CATHOLIC UNIVERSITY.— THE CONGRESSIONAL LIBRARY.

THE Catholic authorities determined sometime ago to locate their University at Washington. The scheme contemplates a school on the broadest scale. They intend to erect a divinity, scientific, academic and other schools, having in connection with them a chapel, library and observatory.

The university buildings of which seven are contemplated will be grouped around a central park. The site selected adjoins the beautiful park belonging to the Soldier's Home, and the sites for the different structures have been selected but the plans have been made only for the Divinity School. The Science department will occupy the central space facing the principal avenue. A large church is contemplated on the north between the park and the divinity building; these structures being connected by an arcade.

The observatory will occupy a high knoll on the grounds, and sites are reserved for different colleges to be erected by various Catholic religious orders. The front of the park will be reserved for professors' residences.

In a previous letter I mentioned the fact of Mr. Baldwin having been selected as the architect for the Divinity Building.

This building has a centre 56 feet by 70, with side extensions and wings 170 feet, making the frontage 226 feet. The centre building will be five stories in height with wings four stories. The roof is hipped and covered with Spanish tile. The exterior walls are of blue gneiss, quarried on the Potomac, and trimmed with light Ohio sandstone. The design was certainly inferior to either of the prize designs in the competition. The authorities according to the papers already have in hand between four and five hundred thousand dollars on which to commence operations, and contributions seem to be constantly coming in.

Attention has been called to the Congressional Library by the action of the House of Representatives in attempting to stop the work.

The general impression was that Congress adopted a plan without reference to cost, as the materials and methods of construction at the time of adoption were not decided. The work was put in charge of a commission who were proceeding under this idea, the best material and construction being adopted in every case as advised by the architect. The dispute between the architect and contractors in reference to the quality of cement was the cause of strong and persistent effort on the part of said contractors to displace the architect, and failing in that, to give him as much trouble as a combination of money and Congressional influence could effect. At least, these are the conclusions I, as an outside spectator, have formed. First an engineer was put in as a superintendent of construction, then the House passed a bill to stop the work, but I am pleased to think that the Senate will not agree with the House.

The architect has undoubtedly devoted an enormous amount of time, energy and money to the solution of this problem. In 1872 he won the first competition for the Library. Since that time to the present day, he has devoted himself to the solution of the different problems

connected with a large library building. He has made sketches or studies in many varieties of Gothic, Romanesque and Classic architecture, variations in plans, etc., for the instruction of the committees of Congress, through the years from 1872 to the present time, besides having made a special trip across the ocean to study the European libraries. In 1886, his plans were again adopted against forty-odd competitors. Architects cannot help but feel a sympathy with him, when he receives such treatment only because he was very careful to procure cement of an extra quality for the foundations of the Library Building and because some members of the House think that they see an opportunity to please their constituents.

Even if the bill did call for a building to cost $3,000,000 complete, which is affirmed on the one side and denied on the other, it has become so much a matter of practice and precedent (a practice never before objected to by Congress, so far as I know) to pass a bill for a public building, placing the estimate at one-half or one-third its actual cost, that there seems no reason why the House should select this special building as a mark for its honest indignation. But the the cement contractors were active and influential, and the presidential election is at hand.

The building will be larger than any building in this city, except the Capitol, fronting on all four streets, and built of stone. By comparison with the other buildings, it would not be reasonable to expect it to cost so little as $3,000,000. The excavations for the entire building have been made and the concrete foundation is already in.

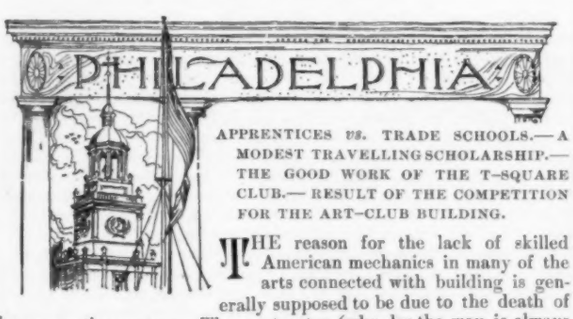
The contracts are let, I think, for the stonework on the western front and rotunda. It is intended to limit the erection to this portion at present. The building is to be quadrangular, 465 feet on the east and west fronts and 332 feet on the north and south fronts. At the corners are pavilions and the central portion is emphasized by an additional story. The interior of the quadrangle is occupied by the reading-room, galleries for books and ten open courts. When entirely complete it is intended to hold ten million books and have show-rooms for copyrighted engravings and other art subjects, a large collection of such matter having already accumulated, as well as rooms for clerical, packing, binding and executive purposes. The reading-room is the principal feature of the building being one hundred feet in diameter and ninety feet from floor to top of dome. It is lighted by eight large semicircular windows, thirty-six feet in diameter, placed above the book repositories and by a lantern thirty feet in diameter in the centre of the rotunda. This gives about one square foot of light to ninety-five cubic feet of space. This is about twice as much light as the Paris Library, and about four times as much as the Library of the British Museum. The gallery for visitors who are not readers will be about fifty feet from the floor, directly under the semicircular windows. The main entrance will face the Capitol while the rear or eastern entrance will be used for receiving and shipping goods. The cellar is given up entirely to heating and ventilating; the boilers being placed outside, the heated air is to be let in near the top and drawn out by exhaust fans near the floor. Mr. Smithmeyer expects by this method to prevent the accumulation of hot air at the top of the rooms where it would be very injurious to book-bindings.

The soil is well drained to prevent dampness from the ground, and ten-foot areas encircle the building to prevent the contact of the earth with the walls, and the footings are large masses of the best concrete, with granite footings to the walls proper.

The building is to be fireproof according to the most modern understanding of the term. The book-racks are to be of iron with slate shelves, while the different book compartments will be separated from each other by two thicknesses of sheet-iron with asbestos between.

The design is Italian Renaissance, the masses being well-handled, simple, classical and refined in treatment.

At the recent Congressional investigation of the subject, Secretary Vilas, who takes the place of Justice Lamar, on the Commission, expressed himself as much pleased with the plans, and hoped sincerely that the construction of the building after them would not be interfered with, and that no niggardliness should be shown in constructing it as everything should be done in the best manner.



APPRENTICES *vs.* TRADE SCHOOLS.— A MODEST TRAVELLING SCHOLARSHIP.— THE GOOD WORK OF THE T-SQUARE CLUB.— RESULT OF THE COMPETITION FOR THE ART-CLUB BUILDING.

THE reason for the lack of skilled American mechanics in many of the arts connected with building is generally supposed to be due to the death of the apprentice system. The contractor (who, by the way, is always a carpenter with us, and not a mason, as is often the case farther North) is, to be sure, nearly certain to be an American; so is the carpenter's foreman, for that matter, the man whom the specifications require to give all necessary measurements to the other workmen and who often supplies most of their brains beside, but most of our carving is done by Scotchmen, Englishmen or Germans: our best stonecutters are nearly all Scotch, and for many of the trades where a more mechanical kind of skill is needed, foreigners of one race or another are employed because they do better work than the natives. There did not seem to be much hope of improvement for the future either, for the nervous impatience of Americans forbid their articling their sons to one man for a series of years, and the Knights of Labor gave another blow to the already well-nigh obsolete system by limiting the number of apprentices that one man might employ. Realizing the situation and forseeing its possible future evils the master-builders of Philadelphia have determined to establish a trade school. Colonel Auchmuty, who founded the New York Trade School at 1st Avenue and 61st Street, has very liberally promised three thousand dollars a year for three years toward the maintenance of this Philadelphia school which will be modelled very much after the New York one. It will in no way interfere with the manual training now taught in the public schools but will serve rather to supplement it. The course is to be three years and will include instruction in carpentry, bricklaying, plumbing, plastering, stone-cutting and all the trades that are a part of house building. The building public is to be congratulated on this very practical recognition of the paramount importance of the training of the young men who are destined to fill the thinning ranks of our trained mechanics.

If this training of the men who are to execute the actual work of building is all important the necessity for the best kind of teaching for those who are to design these buildings is self-evident. But although what corresponds to the apprentice system among the architects is in high favor and there are no Knights of Labor to limit the number of draughtsmen employed by one man the mere office training that a boy gets leaves much to be desired. The intelligent criticism of original designs, for instance, is a help that a boy rarely gets whose work is confined to an office. The Philadelphia Chapter A. I. A., made a move in the right direction not long ago by establishing what is rather ambitiously styled a "travelling-scholarship prize" of fifty dollars, to be paid each year to the junior member submitting the best competitive design in accordance with a given programme, the money to be used in visiting neighboring cities, noting any good architectural features, perhaps studying plans of new office-buildings or in visiting picture-galleries and the like. The result of the first competition has been most gratifying. The problem was a narrow city front four stories high, to be treated in French or Italian Renaissance. The jury, appointed by the president of the Chapter, were Messrs. T. W. Richards, Professor of Architecture at the University of Pennsylvania, T. Roney Williamson and Lindley Johnson. The successful competitor was Mr. E. C. Kent of Mr. Wilson Eyre's office. Although only eight designs were submitted the average merit of them was so high that at the last Chapter meeting it was unanimously decided to hold another competition in the autumn and if this should prove a success to award two prizes a year hereafter.

Ten, or even five, years ago it would have been impossible to get together anything like so good an exhibition of student work as this in Philadelphia. The enormous advance that has lately been made in architecture is not in itself enough to account for the much greater progress that the draughtsmen of to-day have made, both in design and rendering. To achieve this result a good deal of original designing has been necessary — designing untrammelled by the traditions of the office and the effort to give every drawing the stamp of the master. For the last five years the T-square Club of Philadelphia has given its members the opportunity they needed for this kind of competitive sketching. It is not surprising therefore that the scholarship prize-drawing and its closest competitors should have proved, when the names of their authors were revealed, to be the work of members of this organization. The T-square Club was founded through the efforts of three draughtsmen in Mr. T. P. Chandler's office. Its main object was to promote good draughtsmanship by holding competitions after the manner, in a very modest way, of the New York Architectural League. The Club has had various ups and downs, to be sure, but from the first the excellence of the designs submitted (although these have lately been fewer in number than formerly) has been more and more marked. It is probable that every member of the Club has received permanent benefit from it. If it is good for the draughtsmen to see their designs hung side by side with those of professional architects, these latter are spurred to new exertions in order to hold their place. An excellent feature of the order of business at the meetings is the general discussion on the good and bad points of each drawing, by the members, including the author of the design. In the early days of the club it was often a mystery who this author was; but before long each man's style became so well known that no motto or cipher could hide his identity — unless by chance he happened to have none himself. After the discussion a ballot is taken and the results of the first, second and third choice made known and registered. At the end of the year three prizes are awarded according to the total number of points obtained by each man. The fact that the number of competitive sketches seems to have decreased a little of late may be due to the fact that some of the members, whether rightly or wrongly, consider that their time has become too valuable to be used in making sketches "for fun," and at the same time the club has had very few additions to its list. Applications for membership are by no means wanting, but it is one great proof of the usefulness of such an association as this that

the standard of excellence in design necessary for admission has been raised or has raised itself by a natural growth, to a far higher level than formerly.

The New Art Club of Philadelphia, with Prof. Wm. R. Ware as its professional adviser, has just brought to a successful close the most satisfactory competition ever held in this city. I might almost say the *only* satisfactory one, for extraordinary as it may seem this is the first of the numberless recent competitions to have the award based on expert judgment. The fact that the Art Club which is composed of artists and lovers of art thought best to call in Mr. Ware's advice is both significant and encouraging. The fourteen architect-members of the club were asked to compete. Only one hundred dollars was to be paid each competitor but the terms of the competition were so unmistakably just and it was so evident from the first that the best plan would be adopted that eleven out of the fourteen accepted. Mr. Ware and the Committee were unable to decide between the five most satisfactory solutions of the problem and yet none of them were quite perfect. As provided for in this case, a second competition was held among these five remaining competitors and the result was the choice of Mr. Frank Miles Day as architect of the building. It will be an immense boon to local architecture if this Art-Club competition can be made to serve as a precedent.

OTTAWA AND HULL. — THE JOGGIN'S LUMBER-RAFT. — COMPETITION FOR THE TORONTO BOARD OF TRADE BUILDING. — AN AUSTRALIAN LAW SUIT. — UNAVAILING SUIT FOR TRAVELLING EXPENSES. — NEW PLUMBING LAW. — NEW BUILDINGS AT MONTREAL.

THE initial illustration is a view of the very pretty Library Building in connection with the Dominion Houses of Parliament at Ottawa, — a library originally for the use of the members, but of which citizens are allowed to make free use. This view of the building, from the northwest, is taken from the "Parliament Hill" at the edge of the precipice, at the foot of which flows the Ottawa River a couple of hundred feet below. Looking to the north and west, a very fine view is obtained of the well-wooded undulating country, streaked here and there by sparkling rivers. The immediate foreground is entirely spoiled by the lumber town of Hull, and the picturesqueness of the river is lost in the masses of saw-dust floating on its surface. From this hill four fearful conflagrations in Hull have been witnessed by thousands of people, the last one occurring a month or so ago, raging almost unchecked through street after street. Four times has it been partially destroyed, and four times has it been rebuilt in wood, ready for the next accident that shall set it alight. There are few traces left of last month's fire, but not one brick cottage has resulted from the repeated outbreaks of fire.

Of Ottawa itself as a city, there is not much to be said. Were it not that it is the seat of the Government, Ottawa would hardly be in existence. The better class of its inhabitants are all more or less connected with the Government Offices. They have their houses, differing in no way from the houses of other places; the principal buildings are Governmental — the three blocks of the Houses of Parliament, the Postal-Department Building, the Geological Museum, etc. Churches there are, but none particularly striking; second-rate shops; bad roads and break-leg sidewalks; the climate very severe, extremes of cold and heat consequent upon the sandy soil and the distance from any sheet of water — this is the sum and substance of Ottawa. Hull is the bugbear of Ottawa, spoiling the scenery, ruining the river, presenting piles of lumber in every direction which extend for miles into the country, and create the chilly blasts caused by the refrigerating properties of piled wood: to these defects must be added the ugly lumber mills with their diabolical saws which cause daily accidents of more or less horrible description.

Mr. Robertson, of the "Joggin's Raft," has recently been to Ottawa about the duties on the logs and the wire-rope used in its construction, and as the former raft which was lost was particularly noticed in this journal, it may interest readers to know about this second venture. It is to be launched[1] at the full-moon tide in July. Its shape is said to be like a huge cigar, six hundred feet long, fifty-three feet breadth, thirty-eight feet high in centre, drawing twenty-two feet of water. It contains twenty-two thousand logs, averaging thirty-eight feet long, eleven and one-half inches butt, six inches end. No less than thirty-three tons of chain are required for binding the logs together, and the whole is valued at $33,000.

The competition for the New Board of Trade Building, Toronto, is now occupying the attention of a goodly number of architects. Some dissatisfaction has been expressed at the arrangement of paying four architects for their designs instead of offering premiums for the encouragement of others. Clause eleven of the regulations has a sentence which naturally makes would-be competitors open their eyes. It runs, "He" (Professor Ware) "will employ a competent person to throw out from consideration all drawings not made in conformity with these instructions." This is a great power with which to invest a person whose name is unknown at present, a power very easily, accidently abused. We all have confidence in Professor Ware's honor and justice, but it seems only fair that the name of his assistant should be made known without delay. The Board of Trade has every intention that this competition shall be carried out in the fairest manner, and as many of their clauses are similar to those issued in the instructions for the competition of the State Soldiers' and Sailors' Monument at Indianapolis, it is expected that the same honorable spirit will pervade their actions to the end.

An account of the competition and subsequent actions of the Committee of the proposed Court-house and City-hall, Toronto, was given in last month's letter, but it appears but little progress has been made since then. An article in a local paper headed: "That long-promised Court-house" says that "Chairman Jones presided over a meeting of the Court-house Committee yesterday morning, at which the contract drawn up between the city and Architect Lennox was presented for approval. City Solicitor Byjar certified as to the legality of the contract, but further than this he would not go. The architect was professionally represented by Mr. George Kerr, by whom exception was taken to the terms of the contract as being too stringent. The plumbing experts appointed to consider this section of the specifications, reported satisfactorily, merely recommending a few minor alterations. A by-law will be introduced on the earliest available occasion and submitted to the people who will be asked, having had every opportunity of inspecting plans and specifications, to pronounce thereon."

So from this it would appear that it depends on the will of the people whether the Court-house shall be carried out or not. As it is three and one-half years since the competition, it must be highly satisfactory to the citizens.

An article of considerable interest to the profession appears in the *Argus*, a journal of Melbourne, Australia, dated April 25, last, and gives an account of an action brought by a lady against a firm of "architects." The judge called in to his assistance a well-known architect, Mr. Lloyd Taylor, whose professional opinion he desired to have to help him in ariving at a conclusion "on certain issues as to the preparation of plans and specifications and the proper supervision of works done by a firm of 'architects, estate and financial agents' in Melbourne, for a lady who was to pay them a commission of two and one-half per cent on the cost of the building they designed, the erection of which they superintended for her." Mr. Justice Williams "dealing with the issues that properly appertained to himself, said that the defence set up; namely, that the defendants were not architects — was almost trifling with the court. It was perfectly immaterial whether they were or were not architects *de facto*, they held themselves out as architects and agreed in writing with the plaintiff to supervise the building for her. The judge gave the plaintiff the damage estimated by her witness, and he said he had grave doubts whether the amount named was sufficient. The plans and specifications were carelessly prepared and the work improperly supervised. The judge trusted the case would be a warning to gentlemen in the defendants' position who held themselves out as architects to delude and deceive people to employ them when they were utterly incompetent to perform the work, and under the circumstances were no more or less than a fraud on the public." The profession is so little understood by men who ought to know better, that it would be well if justices would remember this case as well as these "fraudulent gentlemen." There was a case tried in Montreal not many months ago which is one in point. The architect for the house which was erected in a town at some distance, sent in his account in due time after completion of the works for his five per cent commission *and travelling expenses*, making no charge for time however. The client refused to pay the expenses on the ground that when he had asked what the architect's charges would be, he was told by the architect, "the usual five per cent," nothing being said about expenses, although it was arranged and understood that the architect was to superintend the work. In the evidence it came out that in the case of nearly every visit, the architect had been asked to come up by the client either by letter or telegram. Several architects subpœnaed as witnesses, testified to the custom of expenses being paid by the clients, all to no purpose, the judge giving a verdict for the client, that as the architect had not mentioned "expenses," he was not entitled to them. The expenses and the costs of the action as may be expected, almost swallowed up the commission. Architects at present have to be very careful how they go to law when an opinion expressed by a number of professional men on an entirely professional subject, goes for nothing with a judge.

The new plumbing by-law in Toronto is a good one indeed, and a move in the right direction with regard to examinations for skilled workmanship. All plumbers, masters and journeymen have now to pass an examination to qualify them to hold a city license to carry on their business and do their work. It is an unusually good move and one made not a moment too soon, and if it could only be followed up by a by-law, forcing all owners of houses to submit to an annual inspection of their drains and further forcing them to make any repairs found necessary, we should soon have healthy cities without

[1] This raft was launched successfully July 24. — Eds.

a doubt. It is taken for granted that the city has done its duty with the mains and outlet, before it calls on plumbers and owners to do theirs. Let us hope for the day when there will be examinations in every trade that affects the health or comfort of those liable to be duped and cheated through incompetent workmen; not every trade only, but every profession also, with special reference to the one we are interested in. Such measures as this by-law would do much to break up the power of the accursed unions.

Nothing further has taken place with reference to the Queen's Park Lease and its forfeiture.[1] The matter has been before the courts but has been relegated to September after the vacation.

A local paper remarks that the new buildings now being erected on St. James Street, Montreal (the principal street) as far as their "beauty and stability" are concerned "would throw discredit upon the capitals of Europe or the great cities of the American Union." Although I am not an American and therefore not likely to be like the Dickinsonian Yankee in my opinion of things in the States, I venture to differ from our local friend's dictum. The New York Life Assurance building, at the corner of Place d'Armes, is progressing, eight stories and a roof, at a cost of $400,000. At the corner diagonally opposite this building, is to be a building of seven stories, for the Imperial Assurance Company, next door to the Bank of Montreal. This Imperial Assurance Building will tower considerably over and dwarf the good proportions of the Bank, and the two monster buildings will entirely spoil the appearance of the little square. But for that, proprietors who mean to make their property pay care little. A considerable sum of money is represented by these buildings, $400,000 for the New York Life, $300,000 for the Imperial, and probably another $350,000 for the Bank of Montreal — $90,000 were recently spent on the alterations of the interior of the latter building. Farther down the street is to be a new building, also seven stories high, at a probable cost of $175,000. This is being built for the corporation of a Methodist church which has just been pulled down on this same site. The ruined appearance of St. James Street is rapidly disappearing and a new street springing up in its stead. The architecture of commercial building of the present day is a study in itself. Although the style is modern, we seem to be borrowing an idea for the worship of Mammon from the Assyrian worship of the heavenly bodies. Seven-story temples seem to be the rage. Personally, I think we might do more in the way of borrowing from them and take a lesson from their coloring propensities. We use more color in our buildings than we did a few years ago, but we might use more with advantage, considering the many colors of the materials at hand. As an investment, this office-building rage is overdoing itself. Only a year ago there were more offices than necessary for the business of the place. Rents for rooms in new buildings were very high, blocks of offices that were expected to bring in seven per cent per annum only brought in four per cent. And now, at the same time, three enormous blocks will be to let.

COMMUNICATIONS

CREOSOTED TIMBER.

BALTIMORE, MD., July 14, 1888.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs. — Will you kindly inform us of the process of creosoting wood timbers such as is used in your city by the most of the builders, and very much oblige,

Yours respectfully, O. DUKER & Co.

[ROUGHLY speaking, timber is creosoted by enclosing it in an air-tight tank, partially exhausting the air so as to draw air and sap, if any, from the pores and then filling the tank with creosote oil under pressure. In less thorough methods the timber is simply put to soak in a vat of the oil. The creosoting works nearest to you are at Norfolk, Va., Perth Amboy, N. J., and Wilmington, N. C. — EDS. AMERICAN ARCHITECT.]

READY-MIXED MORTAR.

PHILADELPHIA, PA., July 11, 1888.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs. — Will you kindly advise us the name and address of the parties who sell mortar at retail in Germany? Our Mr. J. B. Bowen is in Germany now and we would like him to call on this firm and see how their method works. Your early reply will oblige,

Truly yours, S. BOWEN'S SONS.

[THERE are, we believe, fourteen retailers of mortar in Berlin alone, whose addresses can easily be found in the Berlin directory. — EDS. AMERICAN ARCHITECT.]

A COMPETITION TO AVOID.

OTTAWA, ILL., June 28, 1888.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs. — Since writing in relation to the California Court-house, I have received the enclosed "notice to architects" from that point. From information previously received from Redding, it appears that the requirements of the bond is, that the successful competitor is to bind himself that if no bidder is found willing to erect the structure within the estimate accompanying the plans, the architect is to erect it himself at the amount named, in other words, this law, if it exists at all, offers one of the grandest premiums upon rascality ever devised; for I could readily, as the architect of the building, so design it, and arrange the specifications, that while a contractor could not touch it within 20 per cent of the appropriation, I could take it at that amount, and make 20 per cent. It occurs to me, that such a course would be a criminal violation of the general law, which declares, "That no party or person shall act as the agent of two opposite parties in a contract or business transaction; and if such a law exist on the statutes of California, it is void by reason of interference with the general laws of the country; what is your opinion? Respectfully yours, WM. A. YOUMANS, *Architect.*

NOTICE. — Plans and specifications in detail for a Court-House and Jail, to be erected on block 22, in the City of Redding, County of Shasta, State of California. The jail to be constructed adjoining the court-house and connected therewith. The cost of said court-house and jail not to exceed $50,000. The premiums for said drawings, specifications and details accepted to be four per cent of cost of building, said four per cent to include superintendence and travelling expenses. Plans and specifications as above will be received up to 12 o'clock noon, on the 16th day of July, 1888. The Board reserves the right to reject any and all plans. The architect whose plans are accepted will be required to file a bond of $5,000, as required by law. By order of the Board. L. T. DRYDEN, *Chairman.*

Attest: A. F. ROSS, *Clerk.*

[WE should say that this would be a good competition to let alone. As we understand it, the plans, details and specifications for the building have to be deposited before the choice is made, and the architect would have little chance of varying them to save himself, in case the burden of erecting the building should be placed upon him. Moreover, as the local contractors would probably combine against him, and he could hardly abandon his own business to go about buying materials and hiring men, it would probably cost him more for the same work than the local contractors would do it for. The provision that the "successful" architect shall be paid four per cent, instead of the usual five, and shall pay his own travelling expenses, has a skinflint air which augurs ill for the happiness of any member of the profession who may enter into a contract with the managers of this particular enterprise. — EDS. AMERICAN ARCHITECT.]

CONCRETE AND IRON.

NEWARK, N. J., July 10, 1888.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs. — Will you kindly inform me, if there is published in this country any book on "Concrete" and its use in building generally and particularly as combined with iron, when, for instance, beams are used imbedded in concrete to give strength particularly by means of the adhesion between the two materials. Is not concrete generally more in use in England than here and probably that country is the only place where to obtain a valuable publication of the above mentioned kind? An answer will much oblige,

Yours very truly, INQUIRER.

[THE best thing of the kind we know of is a pamphlet published some ten years ago by Thaddeus Hyatt, a maker of side-walk lights in New York. — EDS. AMERICAN ARCHITECT.]

WHAT ARE OUR ART SOCIETIES?

NEW YORK, July 16, 1888.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs. — I wish to obtain a complete list of all the architectural societies, sketch-clubs, artistic bodies and other societies whose objects embrace the promotion of the fine arts. Any aid which you can give me directly through your readers will be appreciated. I will be obliged to any one who will send me addresses of the secretaries of such societies. As a result of this inquiry I will forward for publication a list of societies properly tabulated when the information has been obtained. Yours truly,

F. A. WRIGHT, *Secretary*, Architectural League of New York, 47 Liberty St.

NOTES AND CLIPPINGS

A STORY ABOUT THE CAPITOL AT ALBANY. — Col. Elliott F. Shepard, tells the following story about the New York Capitol at Albany. The building was begun during the war. The plans accepted were on the largest scale. The designs were simply stupendous, John V. L. Pruyn, a well-known character in those days, a Democrat, who was believed to be a copperhead sympathizer, had much to do with the adoption of the plans. He was one of the Commissioners. After the building was well underway, an acquaintance of mine, a Republican, was made a member of the Board of Construction. After looking over the work and studying the prodigious undertaking, he said to Pruyn one day: "How did it ever happen that this building was begun on such a vast scale?"

"I'll tell you," said Pruyn; "I had a notion that the South would be successful in the war; that two Governments would result instead of one. My idea was that New York would want the capital of the Northern Confederation, and if she would build a State-House that would be adequate for a National Capitol she could say to the Confederation: 'Here, take our Capitol, and make Albany the seat of Government.'

"That's how New York happens to have such a structure."

[1] Simply because it is anonymous we are not able to publish a communication on Toronto Parks received recently. — EDS.

Search for Relics of the Incas.— The British consul at Mollendo, in Peru, in his last report states that a limited liability company has lately been formed there, with a capital of about $40,000, called the Compañia Anonima Exploradora de las Hucas del Inca, with the object of searching for antiquities and valuables in the old Inca burial grounds in the district of Cuzco, a concession having been granted to the company by the Government for this purpose. The consul says there is no doubt that many valuable curiosities, and probably deposits of gold and silver, exist in these ancient tombs; but it remains to be seen whether they will pay the cost and trouble of finding.— *Exchange.*

A Ruined City in Texas.— The surveys at present being made for the Kansas City, El Paso and Mexican Railroad, at a point north latitude 33 degrees and west longitude 106 degrees, have passed along the lava flow which by the local population is called the Molpais. It consists of a sea of molten black glass, agitated at the moment of cooling in ragged waves of fantastic shapes. These lava waves or ridges are from ten to twelve feet high with combing crests. This lava flow is about forty miles long from northeast to southwest and from one to ten miles wide. For miles on all sides the country is the most desolate that can be imagined. It has been literally burned up. It consists of fine white ashes to any depth which, so far, has been dug down. To the north of the lava flow, and lying in a country equally desolate and arid, the surveyors have come upon the ruins of Gran Guivera, known already to the early Spanish explorers, but which have been visited by white men less often even than the mysterious ruins of Palenque in Central America. Only a few people at Socorro and White Oaks have been at Gran Guivera, because it is at present forty miles from water. The surveyors found the ruins to be of gigantic stone buildings made in the most substantial manner and of grand proportions. One of them was four acres in extent. All indications around the ruins point to the existence here at one time of dense population. No legend of any kind exists as to how this great city was destroyed or when it was abandoned. One of the engineers attached to the surveying expedition advances the theory that Gran Guivera was in existence and abundantly supplied with water at the time the terrific volcanic eruption took place.— *Engineering and Mining Journal.*

The Sound Tunnel.— The question of a tunnel between Sealand and Sweden, under the Sound, had not been heard of for some time till the other day the Royal Swedish Commissioners, who were examining M. Declancle's application for a concession, sent in their report to the Swedish Government. This exhaustive document winds up with the following conclusions: "That a submarine railway between Sealand and Sconia would no doubt insure several advantages to the international traffic, but that, as the building of it would require a very considerable capital, and the paying of the interest on the cost for a long series of years, would necessitate heavy subventions from both the Danish and the Swedish Governments, in addition to the profits of the traffic, which would be inadequate for this purpose, the proposal for this new way of communication be abandoned for the present; that should ever, under altered circumstances, the want or the desirability of a submarine railway come into prominence, it ought to be built on account of the State, either with its own money or by the aid of capital borrowed for that purpose, and the works should be carried out under superintendence of special commissioners or be contracted away to some accepted person. This arrangement is considered necessary in order to insure to the authorities of these State railways, with which the tunnel would have connection, a proper control of the traffic independent of foreign companies or interests; and finally, that there only, in the last instance, ought to be any question of altogether handing over the undertaking to foreign capital, and that the Government, under no circumstances, ought to tie themselves by entering into contract with private associations or persons before complete plans were forthcoming, and the question of cost fully solved." The Commissioners submit, in conclusion, that M. Declancle's application be not granted. The Government has not yet taken any further steps in the matter.— *Engineering.*

Welding by Electricity.— The Thomson system of electric welding, which we described on page 22 of vol. xliii., is now in operation at the Glasgow Exhibition and is attracting a good deal of attention amongst engineers and electricians. The essentials of welding by this means are (1) a source of electric energy, and (2) a means of transforming that energy into heat at the point where it is desired to locate it. In ordinary practice an alternating dynamo is used. It gives a small current at a high pressure. In the case of the apparatus in operation at Glasgow, which can weld iron from 1-4 inch to 1 1-2 inch in diameter, this pressure is 220 volts. The current passes from the dynamo to a transformer and in a secondary coil of wire composed simply of one turn of heavy copper bar, there is induced a much greater current at a lower pressure. In the apparatus in use the pressure in the secondary coil may be reduced to half a volt. Attached to the ends of this copper bar and in electrical contact with it, are two clamps for holding the pieces of metal to be welded. One of the clamps is movable along a straight axis by a pinion. The parts of metal are placed closely together and held firmly in that position by the pinion, on the application of the heavy current in the secondary coil, the ends become heated, and when sufficiently hot are forced together. The operator has therefore a source of heat as well as a source of pressure easily regulated, so that any metal which will stand the heat necessary can be easily and effectually welded by the process. The exhibitors are the Thomson Welding Company of Boston, and it is shown in the dynamo shed in the space occupied by Mr. Richard Miller, agent of the Thomson-Houston Company in Scotland.— *Engineering.*

A Moving Tale.— In the laying out of Franklin Park a great many houses had, of course, to be removed to make room for improvements, and they were sold to the highest bidder. One of these was secured by a shrewd son of the Emerald Isle, who immediately bought a piece of land in a desirable locality on which to remove his purchase. When the neighbors heard of his plan they became alarmed, and immediately took measures to prevent it from being carried out. They bought the land of him at an advanced price, and he obtained another lot in an equally high-toned neighborhood. Here he was again given something handsome to relinquish his real estate, and it is said that he kept the house on rollers for a year, making money all the time by selling the sightly spots on which he proposed to put his dilapidated shanty. Unlike Poor Joe, this individual became prosperous by "moving on."— *Boston Saturday Evening Gazette.*

TRADE SURVEYS

The outflow of British capital into foreign countries, especially to the Western hemisphere, is increasing, and finds chief employment in national, State and municipal bonds and in railroad securities. A vigorous effort is at the same time being made to build up and extend British foreign trade on this side of the water. This is due partly to the failure of the British interest to maintain its hold as firmly as desired on European and colonial markets. The Germans are more or less successfully contesting for this trade, and hence the outflow of British capital and enterprise into new regions on this side of the Atlantic, where land is cheap and opportunities abundant. The effect so far has been to maintain a more uniform industrial and commercial activity. This outflow of money, supplemented by an increasing outflow of brain and brawn, is steadily broadening the foundations of industrial activity. Statistics, especially those relating to financial matters, reveal the very interesting fact that the markets of the outside world are rapidly increasing their requirements. A new epoch is at hand, and money-lenders and leaders in transportation are preparing to take advantage of the opportunities presented. It is no prophesy whatever to say that a moderate depopulation of the more crowded countries of Europe will take place, or rather, set in, during the next ten years. The talk of a disarmament is simply the result of a financially bankrupt condition of several of the European powers. The pressure upon the peasantry of Europe is becoming too serious to be endured, and the trans-Atlantic attractions are threatening to inaugurate a movement directed to a greater or less equalization of population between the old and new worlds. It is the contemplation of this that is helping the outflow of capital and stimulating a vast number of industrial and engineering enterprises in the Western hemisphere. A list of enterprises involving the expenditure of over one million dollars each that have taken root within the past three or four years would exceed an hundred. The completion of one or more of the isthmus enterprises will give an impetus to this force. Its magnitude is dimly comprehended. It will have a mighty influence on North American affairs and will make the maritime interests of these States second only in the world. Capitalists are foreseeing these possibilities and will be found ere long in possession of the most desirable advantages and properties and franchises. The breaking away of the world's millions from their old haunts is the next great move on the world's checkerboard. The industries of the United States will profit most by the expansion and ship-building, now in its infancy, will become an important industry. This is no pen-picture or piece of random writing, but is based upon facts and foresights and deeply-rooted purposes of those who have long purses and long vision of coming events. The foundation of this growth has been extending ever since 1873. The first step was taken by the doubling of the volume of our circulating medium. The second is being taken by the depression of prices and the amalgamation of similar commercial, manufacturing and other interests. As heretofore stated, one of the pressing problems will soon be the formation of a new and broader national banking system, but the necessities are not yet sufficiently pressing. The railroad people are switching themselves for building so much railroad, but in this they have rendered an invaluable service in opening up vast new regions, the effect of which on the country at large has been and will be to prevent one of those dangerous appreciations in the value of real estate and farm lands and lumber and mineral lands which are constantly threatened by our rapid expansion. The reckless enthusiasm of our railroad-builders is our safety. But for it railroad combinations would be possible which are now impossible, and freight rates would be high and oppressive where they are now low and reasonable. But with all our rapid progress there is a temporary over-supply of money, and this volume of caged energy will burst its way into activity to the advantage of labor and enterprise generally. An equalization of profits is going on at the same time in the old and well-defined industries and avenues, but enormous fortunes will be built up in the newer regions, where the world's millions will seek new homes. The existing trade conditions are all favorable. Traders and speculators regret the decadence of large margins, but the off-setting advantage is a broader and more permanent trade, a more regular manufacturing activity, and even prices year in and year out. The present, to many, threatening trade combinations are simply the quotient of the forces at work in the commercial world, and this combination must continue in the nature of things. As storms sometimes do harm, so also may these rapid combinations deal out injustice temporarily, but the outcome is safe and only good results will be reached. The spinning-jenny is set aside by more complex machinery, but it is only recently that analogous changes have been effected in commercial and transporting interests. Every advance in this direction is marked by permanently lower prices These combinations are simply breaks. The immediate trade outlook is sufficiently encouraging. Prices have apparently reached bottom. New business is backward. Large enterprises are projected. The South is absorbing from ten to fifteen millions of nominal capital per month and the far Southwest is attracting miners and manufacturers in order to supply demands that are arising on the Pacific Coast and in the great interior west of the Mississippi. The salient features are: guarded production in all the industries, declining transportation charges, increased construction of lake and river craft, and increased cultivation of the soil, especially among small farmers and planters. So far as tariff changes are concerned, the country is not half so afraid of them in fact as they are in the abstract. The people are willing to sit down and slide a few steps towards freer trade, but they have no notion of getting too near the edge. They see no other practical means of correcting what they regard as the monopolistic tendency of the hour. The adaptiveness of the American character will be demonstrated under any conditions with what it is accidentally or purposely surrounded. Our growth in manufacturing for twenty-five years has been extraordinarily rapid and at the expense of development in other directions. This will be corrected and that too without the breaking up or down of any manufacturing interest whose existence is necessary to the country.

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